LOCALIZING SENSORY PROCESSING DEFICITS IN PARKINSON'S DISEASE: AUDITORY EVOKED P50 RESPONSES DURING AWAKE DEEP BRAIN STIMULATION SURGERY

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Parkinson's Disease (PD) is a neurodegenerative disorder best known for its motor deficits, but less considered are the cognitive and sensory symptoms which can progress during the course of the disease. Previous studies using magnetoencephalography (MEG) and skin electroencephalography (EEG) have revealed dysfunctions in sensory gating and processing that occur in PD. This study used intraoperative local field potentials (LFPs) to study these sensory deficits in patients undergoing awake deep brain stimulation surgery (DBS) to treat motor symptoms of PD. Measuring LFPs intraoperatively overcomes many of the limitations of using skin EEG to localize sensory gating deficits, enabling more precise anatomical characterization of the networks involved in PD sensory deficits. Data were collected on eight DBS implantations, with LFP measurements of P50 auditory evoked potentials (AEPs) correlated to intraoperative imaging. AEPs, such as the P50, are fundamental to understanding auditory electrophysiology and mechanisms of gating, a filtering process that attenuates cognitive response to redundant sensory stimuli. We correlated abnormal P50 responses with neuroanatomical structures in the brainstem and basal ganglia. This data may improve understanding of the deep brain networks involved in PD. We also hope that more detailed characterization of these networks will facilitate the development of DBS protocols for other disorders of dopaminergic dysregulation like schizophrenia, a highly morbid condition with no treatment available for patients refractory to pharmacotherapy.